

Comparative Evaluation between Lavender Essential Oil and Patchouli Essential Oil in Aromatherapy and Its Effect on Dental Anxiety in Children

Santwana Tripathy¹, Anil Kohli², Karuna Sharma³, Rahul Katyayan⁴, Parkhi Bhatnagar⁵, Najmus Sahar⁶

ABSTRACT

Introduction: Dental fear and anxiety is the most common distressing problem for children. Management of dental anxiety in children is one of the most difficult tasks in dentistry. Recently, alternative and contemporary medical approaches such as aromatherapy have received much attention. The potential effects of essential oils such as lavender and patchouli have been found to reduce anxiety, improve mood, and increase sedation. Thus, the study was conducted to compare the evaluation of lavender and patchouli essential oils used in aromatherapy and their effect on dental anxiety in children.

Aim: To compare the efficacy of lavender and patchouli essential oils in aromatherapy and its effect on dental anxiety in children.

Materials and methods: A total of 60 children between 6 and 12 years were randomly allocated to either an experimental or control group that received lavender and patchouli before dental treatment. Child anxiety was measured by using the Chotta Bheem–Chutki scale. A pulse oximeter was used to record the pulse rate. Data was tabulated and analyzed by Statistical Package for the Social Sciences (SPSS) software.

Results: There was a significant reduction in anxiety score and pulse rate between the intervals. Statistical differences were observed in the lavender group compared to patchouli oil.

Conclusion: The positive effects of both lavender and patchouli oil on children can be used to reduce anxiety in children. In our study, lavender oil showed slightly better results than patchouli oil.

Keywords: Aromatherapy, Behavior management, Child dental anxiety, Dental Anxiety, Essential oils, Lavender oil, Nonpharmacological, Patchouli oil.

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INTRODUCTION

In 1937, René-Maurice Gattefossé, a French chemist, developed the phrase “aromatherapy.”¹ Historically, inhalation or topical routes are the common routes to deliver essential oils in aromatherapy. Essential Oils delivered via inhalation route may exert psychological effects.²

Essential oils tend to have various healing properties, including antitoxic, antiseptic, antibacterial, and anti-inflammatory properties. Additionally, it has relaxing, energizing, and tonifying qualities. The inhalation of various aromas during aromatherapy has been linked to relaxation, focus, attention, performance, and healing.³

Most people encounter anxiety at some point in their lives. Dental anxiety is defined as an “abnormal fear or dread of visiting the dentist for preventive care or therapy and unwarranted anxiety over dental procedures” and can have physiological, cognitive, and behavioral consequences.⁴

The first dental appointment is crucial for determining a child’s subsequent behavior toward receiving dental treatment because of dental anxiety.⁵ As a pediatric dentist, it is crucial to recognize that children experience dental anxiety and to employ management strategies that foster a good outlook in the child for future dental visits.⁶

Prevalence of dental anxiety is very common in children; it decreases as the age advances.⁷ The management of dental anxiety in children is regarded one of the most challenging responsibilities for pediatric dentistry professionals.⁸ In routine dental practice, various pharmacological and nonpharmacological ways of behavior management are practiced.⁹ Recently, alternative

¹Department of Pediatric and Preventive Dentistry, SMBT Dental College and Hospital, Sangamner, Maharashtra, India

²Department of Pediatric and Preventive Dentistry, Mithila Minority Dental College and Hospital, Darbhanga, Bihar, India

³⁻⁵Department of Pediatric and Preventive Dentistry, Rama Dental College, Hospital and Research Centre, Kanpur, Uttar Pradesh, India

⁶Department Public Health Dentistry, Teerthanker Mahaveer Dental College, Hospital and Research Centre, Moradabad, Uttar Pradesh, India

Corresponding Author: Santwana Tripathy, Department of Pediatric and Preventive Dentistry, SMBT Dental College and Hospital, Sangamner, Maharashtra, India, Phone: +91 9090371713, e-mail: santwanatripathy23@gmail.com

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and contemporary medicinal approach such as aromatherapy has received awareness in the medical and dental field that involves the application of essential oils of aromatic plants.⁶ The concept of essential oils methods is that they produce a positive pharmacological effect through the sense of smell.¹⁰

Lavender essential oil (*Lavandula angustifolia* and *Lavandula stoechas*, from the Labiatae family) aroma stimulates the

parasympathetic system of the autonomic nervous system, which tends to decrease anxiety, improve mood, and increase sedation.¹¹ A recent study that evaluated dental fear and anxiety indicated that the smell of the dental office was quite effective.¹²

Patchouli oil (*Pogostemoncablin*) has also been shown to be useful for people who experience anxiety or stress.⁵ There are very few studies conducted on the comparative evaluation of lavender and patchouli essential oils used in aromatherapy and its effect on dental anxiety in children. This study was undertaken in order to reduce children's fear of receiving dental treatment while keeping the facts in mind.

MATERIALS AND METHODS

Our study was conducted to compare the efficacy of lavender and patchouli essential oils in aromatherapy and its effect on dental anxiety in children visiting the Outpatient Department of Pediatric and Preventive Dentistry, Rama Dental College Hospital and Research Centre, Kanpur, requiring dental treatment. A total sample of 60 patients aged between 6 and 12 years were selected. The sample size for the present study was calculated based on the data obtained from the pilot study.

Inclusion Criteria

- Patient's first dental visit.
- Patient with good health.
- Patient should be of 6–12 years of age.
- Patient who signs the informed consent.
- Children category 2–4 according to the Frankl behavior rating scale.

Exclusion Criteria

- Uncooperative patient.
- Child suffering from common cold and allergy.
- Medically compromised patients and children with special care needs.
- Children who are not willing to participate.
- Patient allergic to lavender or patchouli plants.

Data were collected through Google Forms, which included demographic information, pulse rate recorded preoperative (pre-op), during treatment, and postoperative, and the Chotta Bheem–Chutki scale to record the anxiety scores. Ethical clearance for the study was obtained by the ethical committee of Rama Dental College & Hospital with a reference of 02/IEC/RDCHRC/2021-22. Before the examination, informed consent was taken from each participant's parents. The consent form was available in Hindi and English. The collection of data was done for about 6 months, from October 2020 to March 2021. All the standard procedures and protocols were followed in accordance with coronavirus disease of 2019 protocols.

METHODS

All the patients who were arriving for their first dental visit were informed, and their demographic information was recorded. Psychometric assessment of dental anxiety was done by the "Chotta Bheem–Chutki scale." A pulse oximeter was used to record the pulse rate. The patients were advised to be seated in the aromatherapy conditioning waiting room for 10 minutes. An aroma oil electric diffuser was used to diffuse the oil. Lavender and patchouli oil were

used for the respective groups. After the exposure, the pulse rate was measured once more. The treatment that had been scheduled was carried out. Finally, after the treatment, the pulse rate was measured. The results were statistically examined and tabulated once all of the details were recorded.

Chotta Bheem–Chutki Scale

Two distinct cards make up the Chotta Bheem scale, one for boys and one for girls. For boys, the Chotta Bheem cartoon figure was selected to symbolize a variety of emotions, and Chutki was specifically chosen for girls to symbolize a variety of emotions. Each card is made up of a group of six figures showing a range of emotions from happy to unhappy. The child was asked to select a face to which they could immediately relate.¹³

Statistical Analysis

The data was entered in Microsoft Excel 2007 and analyzed by using Statistical Package for the Social Sciences (SPSS) software 23.0 version for the present study. The descriptive data were included along with the mean and standard deviation.¹⁴ The intergroup comparison was made using the Chi-squared test and one-way analysis of variance (ANOVA) to find out the difference between the individual groups. The level of significance was fixed at 5% for the present study.

RESULTS

Demographic Details

In the sample size of 60 subjects, 18 (60.0%) subjects were male in the patchouli oil group, and 12 (40.0%) subjects were female in the patchouli group, while 21 (70.0%) were male, and nine (30.0%) were female in the lavender group, respectively. Among the 60 subjects, five (16.7%) participants were under 12 years of age and 5 participants (16.7%) were under 7 years of age in the patchouli group, seven (23.3%) participants were in the 6-year-old age group, and four (13.3%) were in the 4-year-old age group. In the age group of 9 years, three (10.0%) were present in the lavender group, and in the 7-year-old age group, 13 (43.3%) were present in the lavender group, followed by eight (26.7%), four (13.3%), and two (6.7%) followed by two (6.7%) in the 8-year-old age group. A *p*-value of <0.05 (*p* = 0.001) was observed as statistically significant in the lavender group and patchouli group. The most common group found in the lavender group was 12 years. While in the patchouli group, it was found more in the 6-year-old age group (Table 1).

Association between Anxiety Scores and Oil Used

The mean anxiety scores in the patchouli oil group were 3.00 ± 1.78 , and in the lavender oil group, the score was 1.40 ± 0.498 . The intergroup difference between the two groups was statistically significant when analyzed using the independent *t*-test (*p* = 0.001) (Table 2).

Association between Pulse Rate and Oil Used

The mean pulse rate in the patchouli oil group during the pre-op and during the treatment was 100.90 ± 13.21 and 98.00 ± 14.44 . In the lavender oil group, the score was 84.86 ± 12.66 and 81.30 ± 15.32 (Tables 3 and 4) (Fig. 1).

The mean reduction in the pulse rate from the pre-op level to the treatment level was 2.90 ± 11.22 in the patchouli group and 3.66 ± 4.68 in the lavender group. The intergroup comparison of the change in the pulse rate from the pre-op level was statistically

Table 1: Demographics details of the participants

Oil	Demographics	Frequency	Percentage
Patchouli oil	Gender	Male	18 60%
		Female	12 40%
	Age	6 years	07 23.3%
		7 years	05 16.7%
		8 years	03 10%
		9 years	03 10%
		10 years	03 10%
		11 years	04 13.3%
Lavender oil	Gender	Male	21 70%
		Female	09 30%
	Age	6 years	0 0%
		7 years	4 13.3%
		8 years	2 6.7%
		9 years	1 3.3%
		10 years	2 6.7%
		11 years	08 26.7%
		12 years	13 43.3%

non-significant when analyzed using the independent *t*-test ($p = 0.731$).

The intragroup comparison of pulse rate between the three-time intervals (pre-op, during, after, and exposure after treatment) in the patchouli and lavender oil group was statistically significant when analyzed using the repeated measures ANOVA at p -value <0.001 .

DISCUSSION

The chemical composition and therapeutic properties of essential oils are used in aromatherapy, which is regarded a natural form of treatment. It has a number of uses, including massage, inhalation, compresses, and baths, which are used to relieve, relax, and rest the body. In addition, chronic pain, anxiety, depression, various forms of dementia, insomnia, and disease-related stress can all be treated with aromatherapy.¹⁵ Additionally, a lot of essential oils are being used in aromatherapy as stress and depression relievers. These oils are, therefore, regarded a comprehensive supplementary therapy used to improve comfort and alleviate stress.¹⁶

Aromatherapy gained worldwide attention during the 1980s and has been found to heal and stimulate the focus to alleviate emotional and mental distress. It is widely believed that the

Table 2: Anxiety scores among study subjects

Anxiety scores	Oil	Score	Frequency	Percentage	<i>p</i> -value	
Anxiety scores	Patchouli oil	Score 1	04	13.3%	0.001 (significant)	
		Score 2	13	43.3%		
		Score 3	06	20%		
		Score 6	07	23.3%		
		Lavender oil	Score 1	18		60%
			Score 2	12		40%
	Score 3		0	0%		
	Score 6		0	0%		

p-value = significant *p*-value; *p*-value of <0.05 = statistically significant; this indicates that the anxiety score has a correlation with the oil used

Table 3: Effect of patchouli oil and lavender oil on pulse rate

Parameters	Oil	Time Interval	Mean ± SD	<i>p</i> -value
Intergroup comparisons of mean change in pulse rate between the groups	Patchouli oil	Pre-op	100.90 ± 13.21	0.731 (nonsignificant)
		During treatment	98.00 ± 14.44	
		Mean change in pulse rate (from pre-op to during treatment)	2.90 ± 11.22	
	Lavender oil	Pre-op	84.86 ± 12.66	
		During treatment	81.30 ± 15.32	
		Mean change in pulse rate (from pre-op to during treatment)	3.66 ± 4.68	
Intergroup comparisons of mean change in pulse rate between the groups	Patchouli oil	Pre-op	100.90 ± 13.21	0.146 (nonsignificant)
		After treatment	91.23 ± 10.25	
		Mean change in pulse rate (from pre-op to after treatment)	9.66 ± 7.10	
	Lavender oil	Pre-op	84.86 ± 12.66	
		After treatment	77.60 ± 14.10	
		Mean change in pulse rate (from pre-op to after treatment)	7.36 ± 4.76	
Intragroup comparisons of pulse rate between the different time intervals in both groups	Patchouli oil	Pre-op	100.90 ± 13.21	0.001 (significant)
		During treatment	98.00 ± 14.44	
		After treatment	91.23 ± 10.25	
	Lavender oil	Pre-op	84.86 ± 12.66	
		During treatment	81.30 ± 15.32	
		After treatment	77.60 ± 14.10	

p-value = significant *p*-value; *p*-value of <0.05 = statistically significant

Table 4: Anxiety scores based on age groups

Age	Score 1	Score 2	Score 3	Score 6
6 years	9 60.0%	2 13.3%	1 6.7%	3 20.0%
7–8 years	3 23.1%	5 38.5%	2 15.4%	3 23.1%
9–10 years	2 20.0%	4 40.0%	3 30.0%	1 10.0%
11–12 years	8 36.4%	14 63.6%	0 0.0%	0 0.0%

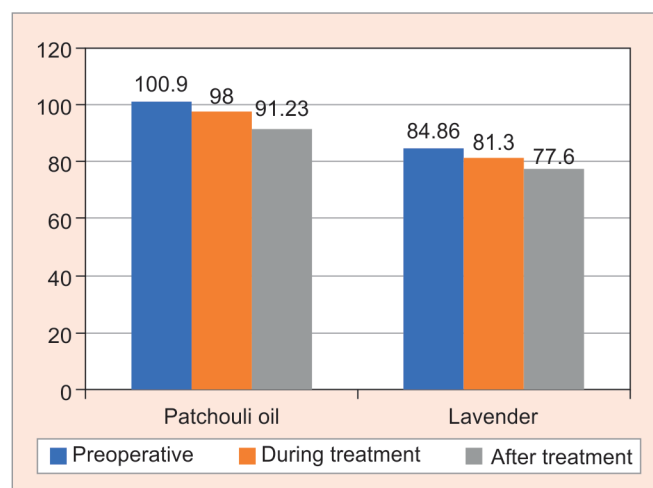
medicinal use of aromatic odors has an emotional effect on humans. Aromatherapy, which uses fragrant and volatile liquids and essential oils for therapeutic purposes, has recently been considered to be useful in the field of dentistry.⁸ According to a study by Venkataramana et al., lavender can effectively lower anxiety levels at the moment and is most effective as an “on-the-spot” anxiety reducer. A behavioral issue that dentists may encounter in their practice is children’s dental anxiety.¹⁷ Their behavior is most difficult to manage. Hence, the children between 6 and 12 years were selected in this study. The induction of emotional changes in essential oils is currently unknown. In dental settings, it has been discovered that the aromas of lavender and patchouli are effective at reducing anxiety. In our study, 18 (60.0%) subjects were male in the patchouli oil group, 12 (40.0%) subjects were female in the patchouli group, 21 (70.0%) were male, whereas nine (30.0%) were female in the lavender group. Similarly, in a study conducted by Gandhi et al.,¹⁸ nine girls and six boys were treated without aroma, and 11 girls and four boys were treated with aroma. There was no statistically significant difference in the gender. In our study, a comparison of the effect of lavender oil and patchouli oil aromatherapy on dental anxiety was done to determine the anxiety score. It indicates that, when compared to patchouli oil, the application of lavender aromatherapy in dental offices has been possibly helpful in affordable intervention for minimizing dental patient anxiety. It was found to be a statistically significant difference among the two groups.

Lavender oil is considered to act postsynaptically by modulating cyclic adenosine monophosphate activity. Essential oils used as ambient odors have the potential to alleviate anxiety and elevate mood in dental offices.¹⁹ When fragrant oils are inhaled, their volatile molecules quickly diffuse into the blood, activating the brain through systemic circulation.

Proponents of aromatherapy have an effective reduction in reducing anxiety. The results of the study encourage further large-scale research to determine the efficacy of essential oils in reducing dental anxiety. The findings can also be generalized to patients with varying levels of dental anxiety and phobia who visit routine dental clinics.²⁰

CONCLUSION

The use of lavender essential oil in dental settings has a significant reduction in pulse rate and anxiety. Lavender essential oil has rekindled attention as a source of potential natural cures as a result of the recent increase in the popularity of alternative medicine and natural products. The physiological and physical well-being are improved by lavender and patchouli oil, which have relaxing and

**Fig. 1:** Association between pulse rate and oil used

sedative properties. In regular pediatric dentistry practice, the use of aromatherapy can be advised to enhance the quality of dental treatments. Aromatherapy could potentially be considered an additional, secure therapeutic approach for easing dental anxiety. In a dental setting, lavender and patchouli should be considered a way to immediately reduce patient anxiety because of their effectiveness in lowering anxiety levels. Therefore, additional studies should be conducted with a bigger sample size, and it is also advised to assess the impact of aromatherapy on more invasive and difficult dental treatments, which can increase patient fear and anxiety.

LIMITATIONS

- The study was conducted on a small sample size, so further studies are recommended with a large sample size.
- It is also suggested to evaluate the effect of other therapeutic aromas, especially during more anxiety-induced dental treatments.

RECOMMENDATIONS

- Children’s dental anxiety can be effectively treated by using lavender oil fragrance.
- During routine pediatric dental procedures, the use of aromatherapy may be advised in order to enhance the standard of treatment.

ORCID

Santwana Tripathy <https://orcid.org/0000-0003-3247-0894>

Parkhi Bhatnagar <https://orcid.org/0000-0002-6427-2828>

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